

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
25 August 2005 (25.08.2005)

PCT

(10) International Publication Number  
**WO 2005/078754 A1**

(51) International Patent Classification<sup>7</sup>: **H01H 33/38**

(72) Inventors; and

(21) International Application Number:  
PCT/KR2005/000388

(75) Inventors/Applicants (for US only): **KANG, Jong-Ho** [KR/KR]; 102-210 Samick Apt., Gasan-dong, Geumcheon-gu, Seoul 153-023 (KR). **JEONG, Hyun-Kyo** [KR/KR]; 104-1201 Arummaul Keonyoung Apt., Emae-dong(emaechon), Bundang-gu, Seongnam-si, Gyeonggi-do 463-731 (KR).

(22) International Filing Date: 11 February 2005 (11.02.2005)

(25) Filing Language: Korean

(74) Agent: **KIM, Sun-Young**; Korea Coal Center, 10th Floor, 80-6 Susong-Dong, Chongro-Ku, Seoul 110-727 (KR).

(26) Publication Language: English

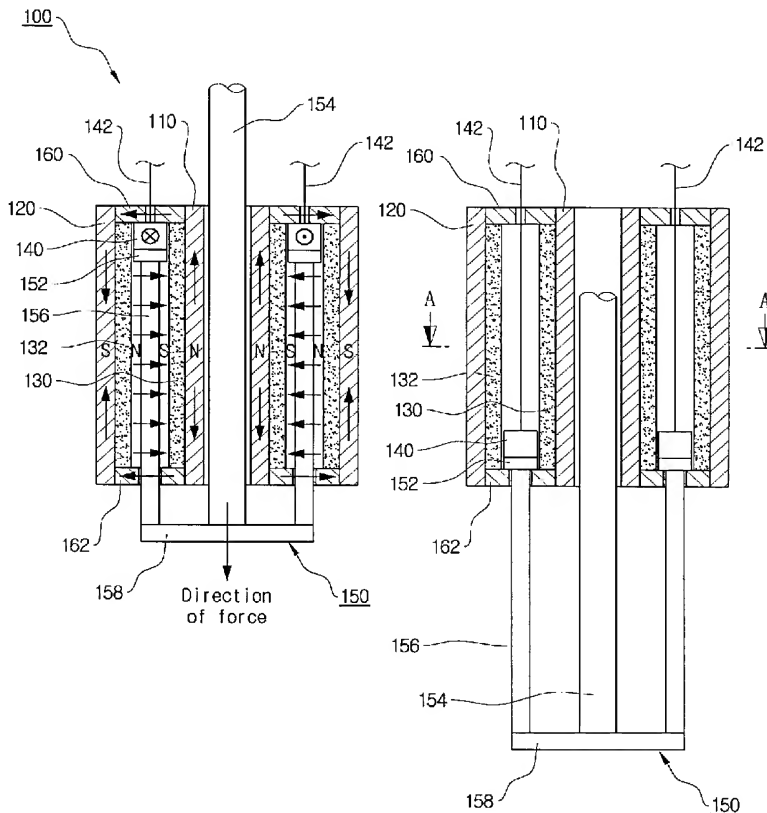
(30) Priority Data:  
10-2004-0008966 11 February 2004 (11.02.2004) KR  
10-2005-0011263 7 February 2005 (07.02.2005) KR

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(71) Applicant (for all designated States except US): **SEOUL NATIONAL UNIVERSITY INDUSTRY FOUNDATION** [KR/KR]; San 4-2 Bongcheon-dong, Gwanak-gu, Seoul 151-050 (KR).

[Continued on next page]

(54) Title: ELECTRO-MAGNETIC FORCE DRIVING ACTUATOR AND CIRCUIT BREAKER USING THE SAME



(57) Abstract: Disclosed are an electro-magnetic force driving actuator and a circuit breaker comprising the actuator. The actuator comprises a hollow inner case made of magnetic material; an outer case made of magnetic material and being concentric with the inner case and radially mounted at an interval outwardly from the inner case; inner and outer permanent magnets abutting on an outer surface of the inner case and an inner surface of the outer case, respectively and positioned to maintain a predetermined gap between the magnets; a coil mounted to be linearly movable in an axial direction between the inner and outer permanent magnets; and a non-magnetic movable member having an end to which the coil is provided and linearly moving in the axial direction between the inner and outer permanent magnets with electromagnetic repulsive forces occurring due to magnetic fields by the inner and outer permanent magnets and a current density of the coil when current is supplied to the coil. The circuit breaker comprises the actuator and an insulation-actuating rod connected to another end of the movable member and linearly moving by the movable member to perform closing and opening operations.

WO 2005/078754 A1



(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— *with international search report*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*